Name:_____ Date:_____

Mr. Carman Algebra 2/Trig H: Regression, Correlation (Day 1)

DO NOW: (Review)

Aziz and Jason are pushing a box. Aziz pushes with a force of 51 pounds in an easterly direction, and Jason pushes with a force of 40 pounds in a northeasterly direction. The resultant force forms an angle of 33° with the 40 pound force. **Find the magnitude of the resultant force**, to the nearest pound.

REMINDER: To reset your calculator's settings (Graphs, Tables, Statistics Data, etc) Use these steps:

1) Go to the home screen
2) Press: 2^{nd}, +, 7, 1, 2, (clear)

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1) Mr. Carman asked the *Gamestop* in his home town for the number of *Wii* consoles that they have sold each year since 2007.

Year (x)	**Consoles Sold** (y)
2007	440
2008	457
2009	369
2010	351

a] Write a linear regression equation that represents this set of data (Let $x = 0$ represent the year 2007.)

b] Does the **correlation coefficient** (r) make sense?

c] Using this equation, find the projected number of consoles sold in 2017 to the *nearest whole number.*

2) When *facebook* hit 1,000 users, Mark Zuckerberg began logging the number of total users (x) each minute afterwards (y).

x	y
0	1,000
1	1,049
2	1,100
3	1,157
4	1,212
5	1,271

a] Write an exponential regression equation for this set of data, rounding all values to *four decimal places*.

b] Does the **correlation coefficient** (r) make sense?

c] Using this equation, how many total users should Mr. Zuckerberg expect to see 6.5 minutes after the timer started?

3) The amount of caffeine that remains in your system after drinking a single *Redbull* is indicated below:

Time (x) (in hours)	**mg of caffeine** (y)
15	11.8
30	9.9
45	8.2
60	6.3
75	5.9

a] Write the power regression equation for this set of data, rounding all values to the *nearest ten thousandth.*

b] Does the **correlation coefficient** makes (r) sense?

c] Using this equation, predict the amount of caffeine still remaining in your system after 5 days (nearest tenth of a mg).

4)

Wind Speed (mi/h) *x*	**Wind Chill Factor** (°F) *y*
4	3
5	1
12	−5
16	−7
22	−10
31	−12

a] Write the logarithmic regression equation, rounding coefficients to the *nearest ten thousandth.*

b] Using this equation, find the wind chill factor (nearest degree) when the wind speed is 50 mph.

c] Based on your equation, if the wind chill factor is 0°, what is the wind speed (nearest mph)?

5) The mid-September statewide average gas prices, in dollars per gallon, (y), for the years since 2000, (x), are given in the table below.

Year Since 2000 (x)	Price Per Gallon (y)
1	1.345
2	1.408
3	1.537
4	1.58

a] Write a linear regression equation for this set of data.

b] Using this equation, determine how much *more* the actual 2005 gas price was than the predicted gas price if the actual mid-setember gas price for the year 2005 was $2.956.

6) This table shows the amount of water vapor that will saturate 1 cubic meter of air, at varying temperatures.

Air Temperature (x) (°C)	**Water Vapor (y)** (g)
–20	1
–10	2
0	5
10	9
20	17
30	29
40	50

a] Write an exponential regression equation for this set of data, rounding all values to the *nearest thousandth.*

b] Using this equation, predict the amount of water vapor that will saturate 1 cubic meter of air at a temperature of 50° C, and round your answer to the *nearest tenth of a gram.*

7)

Time (x) (in minutes)	1	3	5	7	9	11
Number of Bacteria (y)	2	25	81	175	310	497

a] Write a power regression equation for this set of data, rounding all values to *three decimal places.*

b] Using this equation, predict the bacteria's growth, to the *nearest integer*, after 15 minutes.

8) The accompanying table shows the percent of the adult population that married before age 25 in several different years.

Year (*x*)	**Percent** (*y*)
1971	42.4
1976	37.4
1980	37.1
1984	34.1
1989	32.1
1993	28.8
1997	25.7
2000	25.5

a] Find the linear regression equation, rounding coefficients to the *nearest hundredth.*

b] Using your equation, estimate the percent of the adult population in the year 2009 that will marry before age 25, and round to the *nearest tenth of a percent.*